Cisco Prime Service Inventory

Product Overview

Efficient and cost-effective delivery of telecom services depends on close control and management of network resources. Cisco Prime Service Inventory provides highly flexible inventory management capability, proven with virtually all of the world's leading vendors of network equipment and adaptable to changing and converging network technologies.

Cisco Prime Service Inventory offers a consolidated inventory of broadband, next-generation, and transmission networks, maintaining a concurrent view of the physical, logical, and service inventory required to deliver customer services. It allows network equipment, routing, and capacity information to be easily recorded, calculated, and monitored, supporting the analytical and operational tasks required to maintain optimal network capacity and service quality.

Cisco Prime Service Inventory provides:

- Quick and easy resource definition, minimizing training and maintenance costs
- Clear and intuitive visualization of network equipment and routing topologies and rapid analysis of fault impacts allowing faster customer response
- Integration of the inventory of service, broadband, and next-generation networks
- Cost-effective optimization of physical and logical resource management
- Synchronization of network configurations and offline resource databases, reducing waste and maximizing return on investment in fixed assets
- Flexible configuration of new network technologies to support an evolving business

Features and Benefits

Cisco Prime Service Inventory - Key Business Benefits

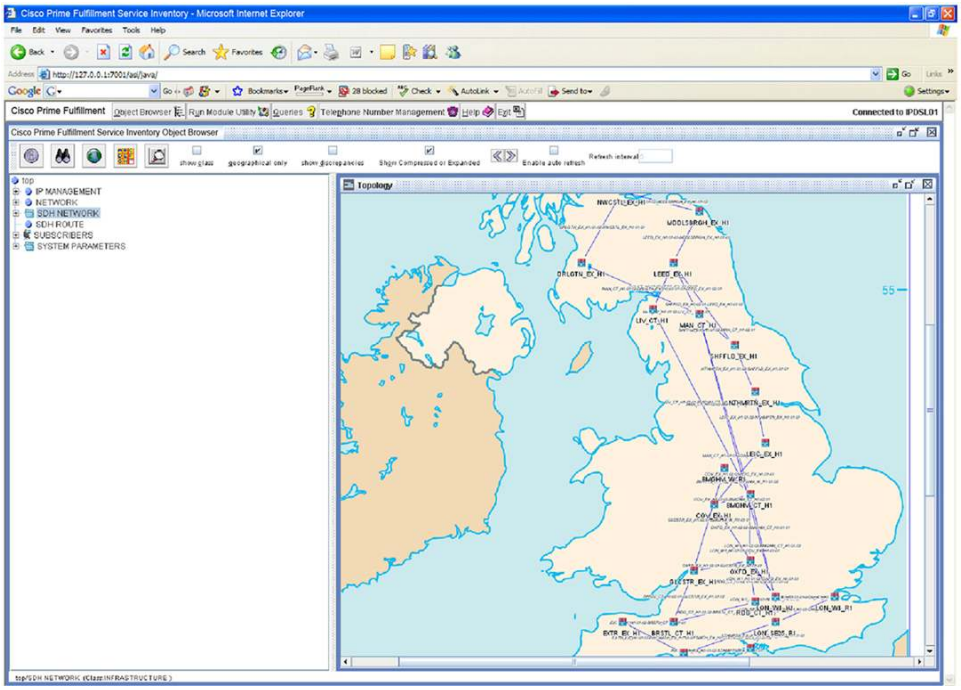
Cisco Prime Service Inventory manages all the resources needed for successful service delivery and network operations. It provides a unique capability not only to model all required physical and logical resources required but also to apply comprehensive processes to the usage of those resources. (See Figure 1.)

Cisco Prime Service Inventory allows the network operator to:

- Represent, model, and manage any usable object, from a physical piece of equipment to a logical entity or action
- Define tasks associated with resources, including (for example) how resources are to be retrieved and what actions are to be executed in respect of those resources
- Apply business rules to objects allowing knowledge associated with them to be published to and shared with other business processes
- View multiple hierarchical and topological representations of object classes, their ancestors, their children, and their other linked objects

- Check the utilization levels of all network inventory objects required to complete the end-to-end delivery of service
- Automatically upload real-time data from the network and compare it with that in Cisco Prime Fulfillment for Inventory and other inventory systems, triggering automatic or manual synchronization of data
- Recover “stranded” assets that inventory records indicate are in use but are not actually linked to any customer or service

Figure 1. Cisco Prime Service Inventory (Indicative Topology)



Modeling Resources in Cisco Prime Service Inventory

Maintenance of network inventory begins with a clear definition of physical and logical resources, their interrelationships, capacity and usage. These definitions must then be stored in a way that allows them be recalled quickly and efficiently to support operational, analytical, and maintenance requirements.

Using the point-and-click GUI of the Cisco Prime Service Inventory Designer application, detailed attributes of all inventory resources are defined quickly and easily. No expensive recoding or time-consuming database schema changes are typically required. The designer client makes the definition of resource moves, adds, changes, and deletes intuitive and straightforward.

Modeling the Network

Cisco Prime Service Inventory is used to model the physical, logical, and service layers of the inventory.

Physical Layer

Physical inventory includes network equipment, shelves, cards, ports, and physical copper or fiber links. Geographic data can be recorded for access by other network management systems and for use in geospatial applications. The physical data model can be further extended with any additional object or attributes which may be needed to support the operator’s key business processes.

Logical Layer

The logical layer includes objects such as logical connectivity, connectivity breakdown of the physical link to virtual and timeslot circuits, STM ring, mesh, star, or hub and spoke topologies.

Cisco Prime Service Inventory supports the modeling, design, and assignment of the Layer 1 (Optical and PDH/SDH), Layer 2 (Ethernet and ATM/FR), and Layer 3 (IP) networks as required, supporting network services and operations including:

- Channelized T1/E1s, for example 30*64 kbps
- The PDH hierarchy from an arbitrary top rate bearer, for example 34 Mpbs/140 Mbps
- Protection circuits either dedicated (1 + 1) or shared (1 + n)
- PDH/SDH/optical bearer hierarchy from 64 kbps, STM-N to DWDM
- Logical structuring of VC12, VC3, VC4 channel hierarchy
- Protection schemes like (1 + 1), (1 + n), SNCP, MSP-ring
- ATM PVC, VCC
- Soft permanent virtual connection (SPVC)
- Layer 3 IP routers with physical and logical configuration
- Layer 3 VPNs
- DSLAMS with their ports
- ATM aggregation in ATM-based DSL networks.
- Metro Ethernet (ME), ME-based aggregation in IP-based DSL technology
- ME standalone
- VPLS, VPWS (E-PIPE), Layer 2 VPNs
- Next-generation networks (NGNs) with triple play (voice, video, and data) infrastructure

Service Layer

In the service layer, Cisco Prime Service Inventory maintains individual service instances on both the logical and physical layers. Modeled services include leased line broadband or any enterprise services commonly provided to enterprise customers. Cisco Prime Service Inventory supports the modeling of broadband and IP-based services or traditional SDH-type services on both the logical and physical infrastructure, including A-link, A-bis, A-ter, Data, E-interface, Gb, and leased line services. It also provides the capability to record subscribers and customers (including customer-specific information) using individual services.

Linking Objects

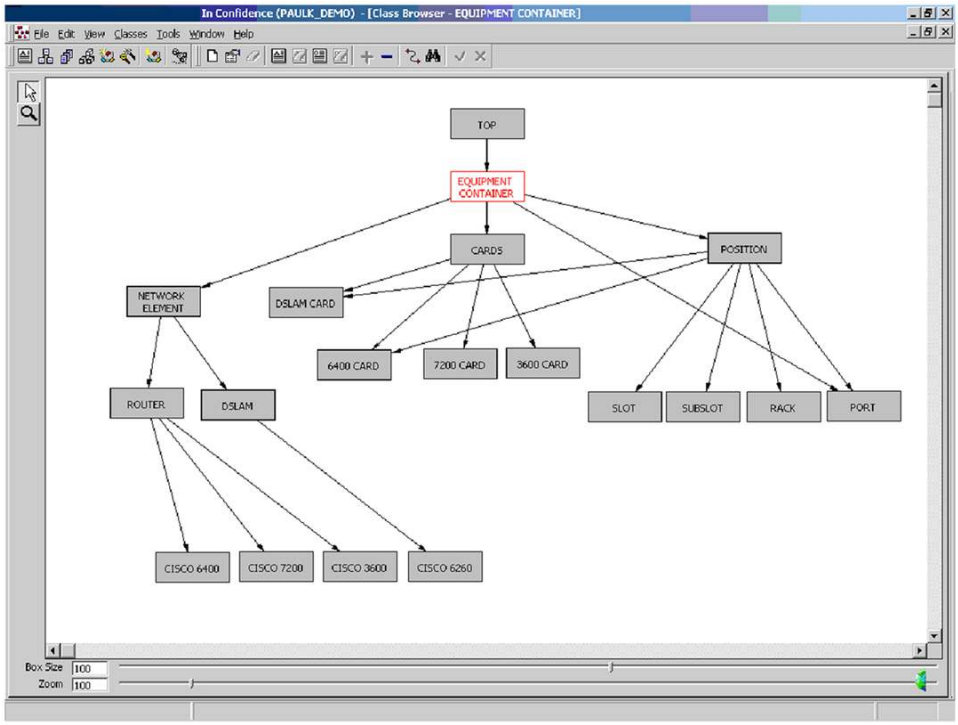
By linking objects together, relationships can be created between:

- Physical objects such as cards and slots
- Physical and logical objects such as routers and services
- Logical objects such as customers, routes, and services

Creating such relationships is vital if there is to be continuity in the relationship between resources, services, and customers.

Managing Scale and Change

Figure 2. Object Modeling



The advanced nature of the Cisco Prime Service Inventory architecture means that the volume of network changes that will inevitably take place over time can be easily handled. Standard capability includes the reservation of resources for dedicated services (ahead of time), their utilization (during a given time), and release (at precisely the right time).

Object class containers are central to the architecture. New or changed objects immediately inherit attributes from their class, its parents, and all its ancestors, saving considerable time and cost in managing inventory entities. (See Figure 2.)

Assessing Impact

Understanding the relationships between objects also means that the impact on services or customers of any resource failure or performance issues can be immediately understood. It means that the corresponding impact on the overall quality and availability of service can be assessed and that appropriate actions can be taken to minimize the impact of the problem, to restore service quality and to make appropriate communications with customers and partners.

Discovery and Reconciliation

Cisco Prime Service Inventory offers a number of built-in utilities that allow network elements to be identified, compared with the record held on the database, and reconciled so that the inventory record and the actual situation are aligned.

Cisco Prime The capability allows two approaches to network element identification:

- Inventory-driven upload. This takes the network elements recorded on the inventory and confirms their existence or otherwise on the network.
- Network-driven autodiscovery. This sweeps the network independently of the inventory and builds a record of elements and capability.

Broadly, Cisco Prime Service Inventory expects objects defined as network elements to be consistent with an external source (either the network element itself or a network element manager). Reconciliation can be performed against such objects and any discrepancies identified in one of three ways:

- Information is held in the inventory but not found externally.
- Information is found in the external source but not recorded in the inventory.
- White-listed elements (used for planning or maintenance) are not expected to be synchronized.

Reconciliation having been performed, any discrepancies can be reconciled in a number of ways - automatically, using the network or the inventory as the master, or issuing an alert to a user or group of users requesting manual intervention.

Discovery and reconciliation offer real financial benefits, including:

- Recovery of “stranded” (unrecorded and unused) assets that inventory records indicate are allocated but that are not actually linked to any customer or service.
- Reports on resource availability and capacity usage in the network, allowing forward planning and optimized build out in anticipation of demand.

Given the scale of network moves, adds, changes, and deletes commonly applied to any network, synchronizing inventory data in this way has been shown to save significant amounts of time and cost in the management of today’s network infrastructures.

Reconciliation can be scheduled to run at regular intervals to help ensure that Cisco Prime Service Inventory is always synchronized with the network.

Managing IP Addresses and VLAN Identifiers

In order to handle the vast number of IP and Ethernet enabled devices involved in Internet-based services, the task of allocating and using IP addresses and VLAN identifiers is given special attention. When Cisco Prime Service Inventory recognizes that new IP addresses are required, it can control the IP allocation and modeling process, including, for example, contact with the Réseaux IP Européens (RIPE) body to help ensure that the necessary administrative and technical coordination is carried out before the operation of an IP-enabled device across European IP networks.

Managing Telephone Numbers

Similarly, because of the high volume of telephone numbers often involved in a provider’s service delivery business, provision is made for managing telephone numbers in Cisco Prime Service Inventory, and their subsequent usage analyzed. Numbers may be loaded interactively or in batches.

Working with Cisco Prime Service Inventory

Cisco Prime Fulfillment fully supports a modular approach to systems design. It facilitates the design and creation of inventory objects and includes the ability to define business rules as modular objects. Elsewhere, a modular approach is taken to integration, which are created using appropriate combinations of functionality, protocol adapters, and device drivers. The modular concept helps ensure that development can be reused; for example, once a common XML Device Driver has been developed, it can then be reused many times to support multiple element management systems (EMSs) with only minor modifications to suit each system.

Cisco Prime Service Inventory has been built to be both open and flexible in design, and it is possible to customize many aspects of the product, including the following:

- **GUI:** The user interface can be customized to local standards and to restrict user access to appropriate information only.
- **Object model:** An object model based upon best practices guidelines will be supplied; however, it is common for this to be customized for locally specific business requirements.
- **Thresholds:** Cisco Prime Service Inventory can define thresholds for various aspects of network control and management and can monitor items such as exchange capacity, network element capacity, and number availability. Various mechanisms are available to react to these thresholds from a simple on-screen notification to Short Message Service (SMS) and email notifications.
- **Calculations:** Various different calculations can be performed on Cisco Prime Service Inventory information.
- **Reporting:** Cisco Prime Service Inventory makes Oracle views available, allowing the data to be viewed in a normalized manner. This data can also be viewed using third-party tools such as business objects.

Cisco Prime Fulfillment allows users to present results in multiple formats - examples of previous implementations include presentation as spreadsheets, comma-separated value (CSV) files, graphs, BLOB/CLOB database objects, and standard or formatted emails.

User Interface

Key design principles of the GUI include:

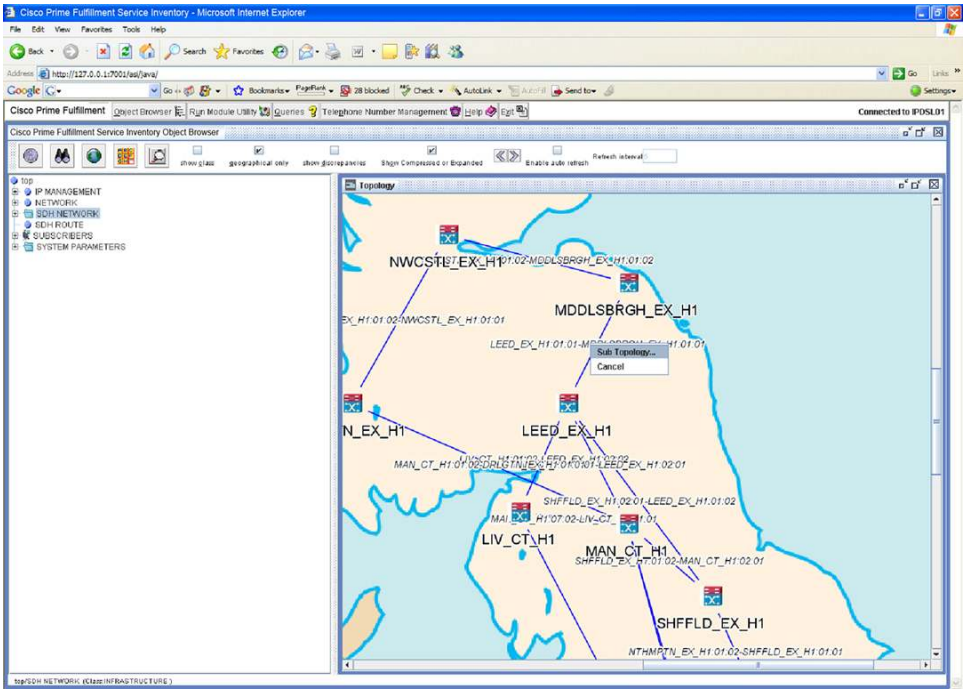
- Java or HTML base
- Customizable views
- Tree structure navigation
- Visualization support
- Simple and complex search support
- Easy-to-use GUI-based scripting facility for customization
- Extensible architecture, allowing new attributes or objects to be supported without fundamental code modifications
- User access and authentication control (including two-factor authentication)

Visualization

Cisco Prime Service Inventory has extensive visualization capabilities that are continuously enhanced. Scheduled enhancements to the current capabilities will provide the following key features:

- Network visualization based on technologies such as IP and Ethernet
- Metadata-based visualization to help enable the modeling of new technologies without coding
- Ability to associate user-defined attributes to visualized objects
- Ability either manually or automatically to display the network
- Ability to overlay network topology onto maps (see Figure 3) Ability to navigate from objects to lower layer objects

Figure 3. Cisco Prime Service Inventory (Indicative Topology)



Routing

Cisco Prime Fulfillment supports recognized algorithms for calculations such as network routing, utilization, and cost. These are not hard coded, however, modifications can be made to the functionality without requiring any recoding of the product.

Improving Reliability and Repeatability

Resource components are created and maintained within Cisco Prime Service Inventory to help ensure that the business rules required to perform operational functions against resources can be applied in a repeatable and consistent fashion. This is achieved by defining a set of tasks to perform the function (known as a **module**), and then providing the resource information associated with those tasks to the inventory management process as it unfolds.

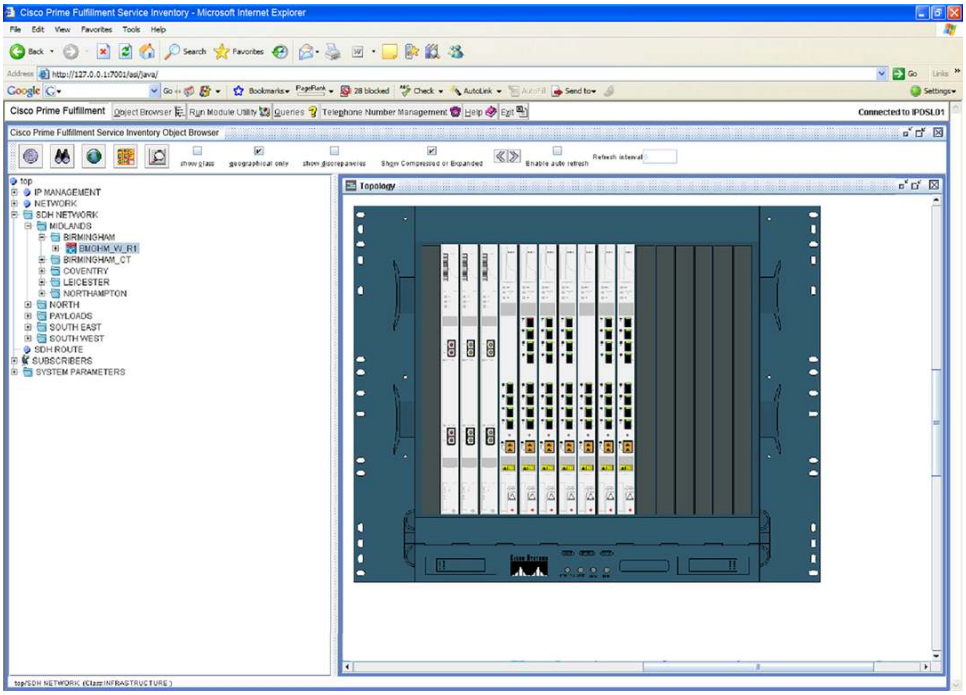
For example, a module could use information about Ethernet switches, and the rings they form, to quickly and repeatedly provision virtual circuits based on attributes such as least number of nodes, highest available bandwidth, or lowest transit cost.

Maximizing Resource Usage

During the delivery process, Cisco Prime Service Inventory works closely with the business process management system to help ensure maximum utilization of resources at all times (see Figure 4.) For example, if it finds that spare capacity is available, then it allocates the required ports, circuits, and other resources to the appropriate task in the process. If on the other hand it discovers that capacity is low or unavailable, then it can respond with the messages required to trigger a new requisitioning sequence.

This means not only that the utilization of existing equipment is assured but also that levels of unallocated inventory are maintained at optimal levels; new equipment need only be ordered when essential. No spare inventory sits needlessly on warehouse shelves; no capital is unnecessarily tied up. Instead, equipment is automatically ordered on a “just in time” bas is, dramatically improving the network planning operation.

Figure 4. Cisco Prime Service Inventory Resource Visualization



Cisco Prime Service Inventory can easily be integrated with financial systems, allowing the value of utilized and nonutilized inventory to be monitored.

Importing Data

Data such as telephone numbers can be imported into Cisco Prime Service Inventory from a variety of sources using formats including Structured Query Language (SQL), CSV, and Extensible Markup Language (XML). This import can happen on an impromptu or scheduled basis as required.

Data can also be imported into Cisco Prime Service Inventory directly from the network. For example, attributes can be uploaded from a single device, from an end-to-end connection, or from an entire network domain. Such an upload process can be triggered from an automated workflow process or can be triggered manually (or on a user-defined timeframe) from the Cisco Prime Service Inventory GUI.

Cisco Prime Service Inventory - Key Product Features

Cisco Prime Service Inventory Designer Client

Cisco Prime Service Inventory manages inventory for any network, service, and customer equipment and resources and controls utilization or those resources with a unique modeling engine. It includes a module library of common tasks and tools for creating further modules for almost any required manipulation of inventory data. It includes four clients: the designer client, the Java client, the web client, and the Run Module Utility.

Cisco Prime Service Inventory is designed for the management of inventories. It was originally designed for use in the telecommunications industry, but is sufficiently flexible to be used almost anywhere that stock control and management are important. Based on an object-oriented modeling system, it uses a client front end to visualize and manipulate the objects stored in the back-end database.

Designer client features include the following:

- Object browsing and manipulation tools
- Class browsing and manipulation tools
- Attribute and domain maintenance
- Module creation and maintenance
- Telephone number management tools

Cisco Prime Fulfillment Java Client

The Cisco Prime Fulfillment Java client is an application designed to work with and run actions against inventory data. It runs inside a web browser.

Java client features include the following:

- Object Browser

  A window for viewing the inventory including the following tools:

  - Object Details panel
  - Search panel
  - Topology panel
  - Safe (Service Activation) Monitor
  - Password modification tools
- Run Module Utility

  A tool for running modular code configured for the purpose of manipulating the Object tree
- Queries

  A tool for running custom built, pre-configured parameter queries

  Telephone number management

Cisco Prime Service Inventory Run Module Utility (RMU)

The Cisco Prime Service Inventory Designer Client contains scripting tools called modules. Modules are used to carry out predefined functions within the Service Inventory Object Tree.

RMU is a user-interface for the designer client Although modules can be run directly from the designer client, RMU offers a simplified interface, is much lighter, and contains specific tools for running modules in a user-friendlier environment without the need to run the designer client.

Service Inventory RMU features include the following:

- Module running facility
- Module running configuration tools
- Manual telephone number allocation
- Query tools

Cisco Prime Service Inventory PL/SQL APIs

The APIs provide procedures and functions relating to the following:

- Class
- Attribute
- Domain
- Module
- Object
- Method
- Number

Further Information

About Cisco Prime

The Cisco Prime portfolio of enterprise and service provider management offerings empowers IT organizations to more effectively manage their networks and the services they deliver. Built on a service-centered foundation, the Cisco Prime portfolio of products supports integrated lifecycle management through an intuitive workflow-oriented user experience. The portfolio of Cisco Prime solutions for service providers provides A-to-Z management for IP next-generation networks, mobility, video, and managed services.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco® services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, see Cisco Technical Support Services or Cisco Advanced Services.

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